

**SAF-RC-233**  
**100-IU-2 & 100-IU-6 Remaining**  
**Waste Sites – Soil In-Process**  
**FINAL DATA PACKAGE**

**COMPLETE COPY OF DATA PACKAGE TO:**

Kathy Wendt

H4-21

KW 3/12/13

INITIAL/DATE

**COMMENTS:**

**SDG K4056**

**SAF-RC-233**

Rad only

Chem only

Rad & Chem

Complete

Partial

**Sample Location: 600-371**



A division of Eberline Analytical Corporation

264 Welsh Pool Road  
Exton, Pennsylvania 19341  
Phone (610) 280-3000  
Fax (610) 280-3041

11 March 2013

Joan Kessner  
WC-Hanford, Inc.  
2620 Fermi Avenue  
MSIN H4-21  
Richland, WA 99354

Subject: Analytical Data Package

Dear Ms. Kessner:

Enclosed are the hard copy analytical reports for the batch number/fraction indicated (marked X) in the following table:

LvLI Batch #	1301063
SDG #	K4056
SAF #	RC-233
Date Received	01/25/13
# Samples	1
Matrix	SOIL
Volatiles	
Semivolatiles	
Pest/PCB	
Glycols	
DRO/KRO/GRO	
PAHs	
Herbicides	
Metals	X
Inorganics	

The electronic data deliverable (EDD) has been emailed. If you have any questions, please don't hesitate to contact me at (610) 280-3012.

Sincerely,

Lionville Laboratory  
A Division of Eberline Analytical Corporation

Orlette S. Johnson  
Project Manager

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 18 pages.

# **CHAIN OF CUSTODY**

00000002

130106c3

# Custody Transfer Record/Lab Work Request

Page 1 of 1

Lionville Laboratory  
A Division of Eberline Analytical Corporation  


## FIELD PERSONNEL: COMPLETE ONLY SHADeD AREAS

Client	130106c3	Relinquished by	Received by	Date	Time	Refrigerator #	Liquid	2	2
Est. Final Proj.	SAFF	QC	RC-233			#/Type Container	Solid	1P1	Last
Project#						Volume	Liquid	125	125
Project Contact/Phone#						Preservatives	Solid	—	—
Lionville Laboratory Project Manager	Delett Johnson	Del	SHL	TAT	15	ANALYSES REQUESTED →	ORGANIC	INORG	
Date Rec'd	1-25-13	Date Due	2-9-13	VOA	BNA	Pest/PCB	Herb	Metal	ZN
MATRIX CODES:		Lab ID	Client ID/Description	Matrix	Matrix Collected	Date Collected	Time Collected	TCLP	TCLP
VW Water	01	JIR D42	✓ ✓	S	1-23-13	1045		metals	metals
VW Waste Water								X	X
GW Groundwater								X	X
WST Waste									
WI Wipe									
SO Solid									
S Soil									
SL Sludge									
SE Sediment									
PC Paint Chips									
O Oil									
NAL Non-Aqueous									
L Leachate									
A Air									
T Tissue									
F Fish									

**Special Instructions:**

METALS = HSL + B, Mo, Si; (no Ti)

\* Please ~~hold~~ → Hold TCLP until directed to run by Team Leader.

1. Please ~~hold~~ → Hold TCLP until directed to run by Team Leader.

2.   
3.   
4.   
5.   
6.

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-233-005	Page 1 of 1
Collector <b>DOUG JONES</b> Breakfast, MT <i>12-3-13</i>	Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites - Soil In-Proce	Company Contact Joan Kessner	Telephone No. 509-375-4688	Project Coordinator KESSNER, JH	Price Code 8C Data Turnaround <b>15 Days</b>
Ice Chest No. <b>WCH-12-023</b>	Sampling Location 600-371	Field Logbook No. EL-1666	COA 0603712600	SAF No. RC-233	Method of Shipment <i>Fed Ex</i>
Shipped To EBERLINE SERVICES, TROYVILLE		Offsite Property No. <b>A120717</b>		Bill of Lading/Air Bill No. <b>Seco SPC</b>	
POSSIBLE SAMPLE HAZARDS/REMARKS <i>May contain hazardous substances at levels that present risk to humans and/or the environment</i>					
Special Handling and/or Storage <i>Maintain preservation as indicated in header</i>		Preservation	Cool 4C	None	
		Type of Container	G/P	aG	
		No. of Container(s)	1	1	
		Volume	125mL	125mL	
		See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	
SAMPLE ANALYSIS					
Sample No. <b>J1RD42</b>	Matrix * <b>SOIL</b>	Sample Date <b>1/23/13</b>	Sample Time <b>1045</b>	X X	
CHAIN OF POSSESSION		Sign/Print Names			
Relinquished By/Removed From <b>Joan Kessner</b> <i>1-23-13 1150</i>	Date/Time	Received By/Stored In <b>BHudson Blaketon</b> <i>1/23/13 1050</i>	Date/Time	SPECIAL INSTRUCTIONS	
Relinquished By/Removed From <b>B. Hudson</b> <i>1/23/13 1135</i>	Date/Time	Received By/Stored In <b>A. Freier</b> <i>1-23-13</i>	Date/Time <b>1135</b>	** Please leach and hold TCLP until directed to run analysis by Joan Kessner	
Relinquished By/Removed From <b>A. Freier</b> <i>1-23-13</i>	Date/Time	Received By/Stored In <b>L. Schaefer</b> <i>1/23/13</i>	Date/Time	(1) ICP Metals - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Silicon, Silver, Sodium, Vanadium, Zinc}; Mercury -7471 - (CV) {Mercury} (2) Metals by ICP (TCIP) - 1311/6010 {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; Mercury (TCIP) - 1311/7470 {Mercury}	
Relinquished By/Removed From <b>L. Schaefer</b> <i>1-25-13 1045</i>	Date/Time	Received By/Stored In <b>DSu</b> <i>1-25-13 1045</i>	Date/Time		
Relinquished By/Removed From <b>DSu</b> <i>1-25-13 1045</i>	Date/Time	Received By/Stored In <b>CMB</b> <i>1-23-13</i>	Date/Time		
Relinquished By/Removed From <b>CMB</b> <i>1-23-13</i>	Date/Time	Received By/Stored In <b>CMB</b> <i>1-23-13</i>	Date/Time		
LABORATORY SECTION		Title		Date/Time	
FINAL SAMPLE DISPOSITION		Disposed By		Date/Time	

0000000004

**Lionville Laboratory**  
**SAMPLE RECEIPT CHECKLIST (SRC)**

**CLIENT:** W.C. Hanford  
 Project/SAF/SOW/Release #: RC-233

Date: 1-25-13

**LvL Batch #:** 1301063

Sample Custodian: J. Jones

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier <u>Ex</u>	Airbill # 7945 8387 7896	
2. Custody Seals on coolers or shipping containers intact, signed & dated?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> No Seals
3. Outside of coolers or shipping containers are free from damage?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Comments:
4. All expected paperwork received (coc & other client specific information) sealed in plastic bag and easily accessible?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
5. Samples received <u>cooled</u> or ambient?	Temp <u>3.3</u> °C	Cooler # <u>WCH - 12-023</u>	
How was the temperature taken?	<input type="checkbox"/> IR	<input type="checkbox"/> Temp. Blank	<input type="checkbox"/> Other (Specify):
Is the Temp. Criteria met for these samples? (Hg in soils @ 4°C)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
6. Custody seals on sample containers intact, signed and dated?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> No Seals
7. COC (Client & LvL) signed & dated?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
8. Sample containers are intact?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
9. All samples on COC received? All samples received on COC?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
10. All sample label information matches COC?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
11. Samples properly preserved? (If #5 is no, then this is no.)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
12. Samples received within hold times? Short holds taken to wet lab?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
13. VOA, TOC, TOX, RSK-175, Sulfides, Non-Halogenated VOAs (Alcohol/Glycol) free of headspace?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
14. QC stickers placed on bottles designated by client?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
15. Shipment meets LvL Sample Acceptance Policy? (Identify all bottles that do not meet the policy, which is on the reverse of this page.)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
16. Project Manager contacted concerning any discrepancies?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A

Person Contacted \_\_\_\_\_

Date \_\_\_\_\_

# **METALS**



264 Welsh Pool Road  
Exton, PA 19341  
Phone: 610-280-3000  
Fax: 610-280-3041

WC-Hanford, Inc.  
2620 Fermi Avenue  
Richland WA, 99354

Project: RC-233  
Project Number: K4056  
Project Manager: Joan Kessner

Reported:  
02/12/2013 13:40

**Analytical Report for Metals by SW846 6000/7000 series**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD42	1301063-01	Soil	01/23/2013 10:45	01/25/2013 09:45

000000007



A division of Eberline Analytical Corporation

264 Welsh Pool Road  
Exton, Pennsylvania 19341  
Phone (610) 280-3000  
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## Case Narrative

**Client:** WC-HANFORD RC-233  
**LVL#:** 1301063  
**SDG/SAF#:** K4056/RC-233

**W.O.#:** 60049-001-001-0001-00  
**Date Received:** 01-25-13

### METALS

The following is a summary of the QC results accompanying the sample results. Lionville Laboratory (LvL) certifies that all test results meet the requirements of NELAC except as noted below.

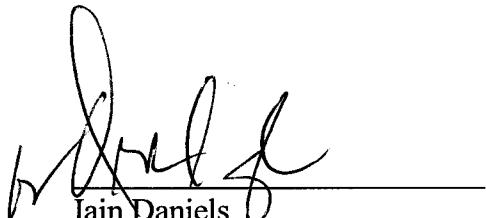
All soil samples are reported on a dry weight basis unless requested by the client, required by the method, or noted otherwise.

1. This narrative covers the analyses of 1 soil sample.
2. The sample was prepared and analyzed in accordance with methods listed on the data report forms.

The sample was analyzed and reported with 3-fold dilutions for ICP metals due to sample matrix.

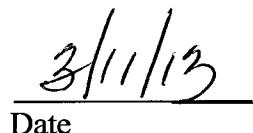
3. All analyses were performed within the required holding times.
4. Please refer to the Sample Receipt Check List for any sample discrepancies in LvL's sample acceptance policy.
5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).
6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the LOQ).
7. All preparation/method blanks (MB) were within method criteria {less than the Limit of Quantitation, samples were greater than 20X MB value}.
8. All ICP Interference Check Standards were within control limits.
9. All Standard Reference Material (SRM) analytes were within the Prediction Interval control limits supplied by the manufacturer.
10. The matrix spike (MS) recoveries for 6 analytes were outside the 75-125% control limits.

11. For analytes where the MS is out of control, a post-digestion MS (PDS) is performed. A PDS was prepared at meaningful concentration levels for the following analytes: Aluminum, Antimony, Calcium, Iron, Magnesium, and Silicon. The Calcium post digestion spike recovery was outside the 75-125% control limit possibly due to matrix effect.
12. The duplicate analyses for 3 analytes were outside 20% Relative Percent Difference (RPD) control limit criteria. The  $\pm$  20% RPD control limit applies to sample results greater than ten times the MDL. The sample results for Arsenic and Copper were less than ten times the MDL.
13. For the purposes of this report, the data have been reported to the Limit of Detection (LOD). Values between the LOD and the Limit of Quantitation (LOQ) are acquired in a region of less-certain quantification.
14. LvL is NELAP accredited by the State of Pennsylvania. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
15. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

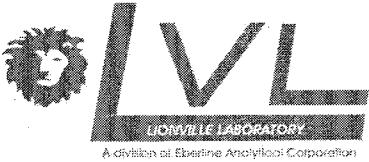


Iain Daniels  
Laboratory Manager  
Lionville Laboratory

m1301063hg%rgc.doc



Date



264 Welsh Pool Road  
Exton, PA 19341  
Phone: 610-280-3000  
Fax: 610-280-3041

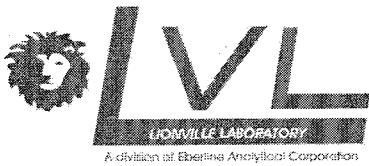
WC-Hanford, Inc.  
2620 Fermi Avenue  
Richland WA, 99354

Project: RC-233  
Project Number: K4056  
Project Manager: Joan Kessner

Reported:  
02/12/2013 13:40

### Notes and Definitions

U	Analyte included in the analysis, but not detected
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
B	Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag)
*	Value outside QC acceptance criteria
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
wet	Sample results reported on a wet weight basis
RPD	Relative Percent Difference



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Reported:  
02/12/2013 13:40

**J1RD42**  
**1301063-01 (Soil)**

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
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**Lionville Laboratory**

**Metals by SW846 6000/7000 series**

Aluminum	<b>8440</b>		16.0	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Antimony	1.92	U	1.92	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Arsenic	<b>8.88</b>		3.20	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Barium	<b>105</b>		1.60	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Beryllium	<b>0.273</b>	B	0.640	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Boron	<b>5.27</b>	B	6.40	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Cadmium	0.640	U	0.640	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Calcium	<b>111000</b>		320	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Chromium	<b>11.7</b>		0.640	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Cobalt	<b>4.15</b>	B	6.40	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Copper	<b>17.9</b>		3.20	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Iron	<b>15000</b>		64.0	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Lead	<b>6.52</b>		1.60	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Magnesium	<b>4410</b>		240	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Manganese	<b>219</b>		16.0	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Molybdenum	<b>1.11</b>	B	6.40	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Nickel	<b>10.0</b>	B	12.8	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Potassium	<b>1560</b>		1280	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Selenium	0.960	U	0.960	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Silicon	<b>236</b>		6.40	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Silver	0.640	U	0.640	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Sodium	<b>245</b>		160	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Vanadium	<b>37.4</b>		8.00	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Zinc	<b>54.2</b>		32.0	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Mercury	0.0324	U	0.0324	mg/kg dry	1	L302014	02/04/2013	02/05/2013	7471A

000000011



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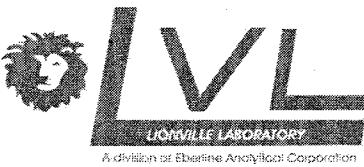
Project: RC-233  
Project Number: K4056  
Project Manager: Joan Kessner

Reported:  
02/12/2013 13:40

**Metals by SW846 6000/7000 series - Quality Control**  
**Lionville Laboratory**

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit		
<b>Batch L302012 - SW 3050B</b>												
<b>Blank (L302012-BLK1)</b>												
Aluminum	4.81	U	4.81	mg/kg wet								
Antimony	0.577	U	0.577	mg/kg wet								
Arsenic	0.962	U	0.962	mg/kg wet								
Barium	0.481	U	0.481	mg/kg wet								
Beryllium	0.192	U	0.192	mg/kg wet								
Boron	1.92	U	1.92	mg/kg wet								
Cadmium	0.192	U	0.192	mg/kg wet								
Calcium	8.94	B	96.2	mg/kg wet								
Chromium	0.192	U	0.192	mg/kg wet								
Cobalt	1.92	U	1.92	mg/kg wet								
Copper	0.962	U	0.962	mg/kg wet								
Iron	19.2	U	19.2	mg/kg wet								
Lead	0.481	U	0.481	mg/kg wet								
Magnesium	3.72	B	72.1	mg/kg wet								
Manganese	4.81	U	4.81	mg/kg wet								
Molybdenum	1.92	U	1.92	mg/kg wet								
Nickel	3.85	U	3.85	mg/kg wet								
Potassium	385	U	385	mg/kg wet								
Selenium	0.288	U	0.288	mg/kg wet								
Silicon	1.99		1.92	mg/kg wet								
Silver	0.192	U	0.192	mg/kg wet								
Sodium	9.73	B	48.1	mg/kg wet								
Vanadium	2.40	U	2.40	mg/kg wet								
Zinc	9.62	U	9.62	mg/kg wet								
<b>Duplicate (L302012-DUP2)</b>												
	<b>Source: 1301063-01</b>											
Aluminum	7660		15.7	mg/kg dry		8440			9.63	20		
Antimony	1.89	U	1.89	mg/kg dry		1.92 U				20		
Arsenic	5.67		3.14	mg/kg dry		8.88			44.1*	20		
Barium	84.9		1.57	mg/kg dry		105			20.9*	20		
Beryllium	0.269	B	0.628	mg/kg dry		0.273			1.33	20		
Boron	5.25	B	6.28	mg/kg dry		5.27			0.389	20		
Cadmium	0.628	U	0.628	mg/kg dry		0.640 U				20		
Calcium	80900		314	mg/kg dry		111000			31.7*	20		
Chromium	10.7		0.628	mg/kg dry		11.7			8.98	20		
Cobalt	4.41	B	6.28	mg/kg dry		4.15			6.10	20		
Copper	14.2		3.14	mg/kg dry		17.9			22.9*	20		

000000012



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WC-Hanford, Inc.  
2620 Fermi Avenue  
Richland WA, 99354

Project: RC-233  
Project Number: K4056  
Project Manager: Joan Kessner

Reported:  
02/12/2013 13:40

### Metals by SW846 6000/7000 series - Quality Control

#### Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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#### Batch L302012 - SW 3050B

Duplicate (L302012-DUP2)	Source: 1301063-01	Prepared: 02/04/2013 Analyzed: 02/06/2013					
Iron	15900	62.8	mg/kg dry	15000		5.93	20
Lead	6.19	1.57	mg/kg dry	6.52		5.18	20
Magnesium	3990	236	mg/kg dry	4410		9.98	20
Manganese	236	15.7	mg/kg dry	219		7.58	20
Molybdenum	6.28	U	6.28	1.11			20
Nickel	9.23	B	12.6	10.0		8.45	20
Potassium	1660	1260	mg/kg dry	1560		5.87	20
Selenium	0.943	U	0.943	0.960 U			20
Silicon	417	6.28	mg/kg dry	236		55.5*	20
Silver	0.628	U	0.628	0.640 U			20
Sodium	291	157	mg/kg dry	245		17.3	20
Vanadium	40.3	7.85	mg/kg dry	37.4		7.38	20
Zinc	45.3	31.4	mg/kg dry	54.2		17.9	20

#### Matrix Spike (L302012-MS2)

Matrix Spike (L302012-MS2)	Source: 1301063-01	Prepared: 02/04/2013 Analyzed: 02/06/2013					
Aluminum	8390	16.0	mg/kg dry	213.34	8440	-22.5*	75-125
Antimony	19.8	1.92	mg/kg dry	53.334	1.92 U	37.1*	75-125
Arsenic	215	3.20	mg/kg dry	213.34	8.88	96.7	75-125
Barium	292	1.60	mg/kg dry	213.34	105	87.6	75-125
Beryllium	5.23	0.640	mg/kg dry	5.3334	0.273	92.9	75-125
Boron	103	6.40	mg/kg dry	106.67	5.27	91.8	75-125
Cadmium	5.44	0.640	mg/kg dry	5.3334	0.640 U	102	75-125
Calcium	106000	320	mg/kg dry	2666.7	111000	-215*	75-125
Chromium	30.3	0.640	mg/kg dry	21.334	11.7	87.2	75-125
Cobalt	52.7	6.40	mg/kg dry	53.334	4.15	91.1	75-125
Copper	40.2	3.20	mg/kg dry	26.667	17.9	83.8	75-125
Iron	14500	64.0	mg/kg dry	106.67	15000	-468*	75-125
Lead	54.3	1.60	mg/kg dry	53.334	6.52	89.6	75-125
Magnesium	6240	240	mg/kg dry	2666.7	4410	68.4*	75-125
Manganese	269	16.0	mg/kg dry	53.334	219	94.3	75-125
Molybdenum	99.8	6.40	mg/kg dry	106.67	1.11	92.5	75-125
Nickel	58.0	12.8	mg/kg dry	53.334	10.0	89.9	75-125
Potassium	4090	1280	mg/kg dry	2666.7	1560	94.8	75-125
Selenium	203	0.960	mg/kg dry	213.34	0.960 U	95.3	75-125
Silicon	404	6.40	mg/kg dry	106.67	236	158*	75-125
Silver	4.90	0.640	mg/kg dry	5.3334	0.640 U	91.9	75-125
Sodium	3000	160	mg/kg dry	2666.7	245	103	75-125

000000013



264 Welsh Pool Road  
Exton, PA 19341  
Phone: 610-280-3000  
Fax: 610-280-3041

WC-Hanford, Inc.  
2620 Fermi Avenue  
Richland WA, 99354

Project: RC-233  
Project Number: K4056  
Project Manager: Joan Kessner

Reported:  
02/12/2013 13:40

### Metals by SW846 6000/7000 series - Quality Control

#### Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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#### Batch L302012 - SW 3050B

Matrix Spike (L302012-MS2)		Source: 1301063-01	Prepared: 02/04/2013 Analyzed: 02/06/2013					
Vanadium	89.6	8.00	mg/kg dry	53.334	37.4	97.7	75-125	
Zinc	97.3	32.0	mg/kg dry	53.334	54.2	80.9	75-125	
Post Spike (L302012-PS2)		Source: 1301063-01	Prepared: 02/04/2013 Analyzed: 02/06/2013					
Aluminum	139000		ug/L	66000	79100	90.1	75-125	
Antimony	324		ug/L	300.00	4.79	106	75-125	
Calcium	1080000		ug/L	62400	1040000	53.4*	75-125	
Iron	253000		ug/L	126000	140000	89.1	75-125	
Magnesium	98200		ug/L	64800	41400	87.7	75-125	
Silicon	9110		ug/L	6300.0	2210	110	75-125	

#### Reference (L302012-SRM1)

			Prepared: 02/04/2013 Analyzed: 02/06/2013		
Aluminum	10800	14.2	mg/kg wet	6670.0	162
Antimony	45.9	1.70	mg/kg wet	53.000	86.7
Arsenic	115	2.83	mg/kg wet	114.00	101
Barium	290	1.42	mg/kg wet	307.00	94.6
Beryllium	108	0.566	mg/kg wet	108.00	100
Boron	80.2	5.66	mg/kg wet	85.100	94.3
Cadmium	230	0.566	mg/kg wet	225.00	102
Calcium	3310	283	mg/kg wet	3360.0	98.4
Chromium	81.5	0.566	mg/kg wet	77.200	106
Cobalt	166	5.66	mg/kg wet	166.00	99.9
Copper	276	2.83	mg/kg wet	271.00	102
Iron	8570	56.6	mg/kg wet	8420.0	102
Lead	181	1.42	mg/kg wet	190.00	95.0
Magnesium	7490	212	mg/kg wet	8570.0	87.4
Manganese	968	14.2	mg/kg wet	965.00	100
Molybdenum	235	5.66	mg/kg wet	235.00	100
Nickel	222	11.3	mg/kg wet	221.00	100
Potassium	13900	1130	mg/kg wet	14400	96.9
Selenium	190	0.849	mg/kg wet	187.00	101
Silicon	501	5.66	mg/kg wet	807.00	62.1
Silver	84.5	0.566	mg/kg wet	83.500	101
Sodium	9610	142	mg/kg wet	9730.0	98.8
Vanadium	106	7.08	mg/kg wet	98.700	107
Zinc	198	28.3	mg/kg wet	199.00	99.6



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Reported:  
02/12/2013 13:40

**Metals by SW846 6000/7000 series - Quality Control**  
**Lionville Laboratory**

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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**Batch L302014 - SW 7471A Prep**

<b>Blank (L302014-BLK1)</b>					Prepared: 02/04/2013	Analyzed: 02/05/2013			
Mercury	0.0290	U	0.0290		mg/kg wet				
<b>Duplicate (L302014-DUP2)</b>		<b>Source: 1301063-01</b>			Prepared: 02/04/2013	Analyzed: 02/05/2013			
Mercury	0.0288	U	0.0288		mg/kg dry	0.0324 U			20
<b>Matrix Spike (L302014-MS2)</b>		<b>Source: 1301063-01</b>			Prepared: 02/04/2013	Analyzed: 02/05/2013			
Mercury	0.201		0.0314		mg/kg dry	0.17455	0.0324 U 115	75-125	20
<b>Reference (L302014-SRM1)</b>					Prepared: 02/04/2013	Analyzed: 02/05/2013			
Mercury	1.29		0.0290		mg/kg wet	1.2900	99.8	62.6-138	

## SAMPLE DIGESTION RECORD

Digestion Batch #: L30207  
 Date/Time Initiated: 2/4/13 1805  
 Date/Time Completed: 2/8/13 1940  
 Analyst: JMW  
 Matrix (circle):  Soil Water Other  
 Method (circle one): 3005A 3010A  3050 200.7 (1994)  
 pH/Turbidity: N/A for Solids.

Digested / Undigested (circle one)  
 Balance #: 614  
 Balance Cal Verification:  N/A  
 Temp: 95  
 BLOCK 1 2 (circle one)

NOTE: All temperatures are recorded as corrected temperatures

Work Order #	Spike Vol (mL)	Initial Wt/Vol (g/mL)	Final Vol (mL)	pH <2	Type: To/Sol/TC	Texture	Color / Appearance	Artifact	Turb
L302062-01		0.56	50		TO	fine	dark brown soil rocks		
L302062-DUP1		0.53	50						
MS1	0.5	0.58	50						
L302063-01		0.54	50		fine	light brown, dirty	vegetation, moss, rocks		
L302062-DUP2		0.55	50						
MS2	0.5	0.54	50						
L302064-01		0.57	50		fine	light brown dirty	moss, chalk/gypsum (?)		
L302062-DUP3		0.53	50						
MS3	0.5	0.58	50						
L302065-01		0.58	50		not fine	brown soil	green flakes (?)		
L302062-DUP4		0.56	50						
MS4	0.5	0.58	50						
L302066-01		0.57	50		not fine	brown, soil	green chunks/flakes, rocks		
L302062-DUP5		0.57	50						
MS5	0.5	0.60	50						
L302067-01		0.59	50		fine	nearly black soil	vegetation		
L302062-DUP6		0.56	50						
MS6	0.5	0.59	50						
L302067-02		0.54	50		fine	brown soil	rocks		
03	0.62	50			fine	brown soil	vegetation		
L302062-BL14		0.52	50		coarse	boiling days			
SRM1	(A)	0.53	50		fine	pink, granular			

Spiking IDs / Expiration Date:  
 MS#: 1300144

Reagent IDs:  
 HNO<sub>3</sub> C000003390  
 HCl 0000018301  
 H<sub>2</sub>O<sub>2</sub> L111A03  
 1:1 HNO<sub>3</sub> 637-076-07  
 1:1 HCl

File ID#:

Data Review By/Date:

Re2/6/13

LCS#: 1201014 (A)

Lionville Laboratory

## MERCURY PREPARATION

Analyst: J. Miller  
 Date: 1/24/13  
 Start Time/Temp: 2110/94°  
 End Time/Temp: 2145/95°

Instrument ID: H63.1  
 Balance #: B14 N/A  
 Pipette Calibration (Daily) (Y)

Prep Batch: L302014  
 Worksheet: HG020501  
 SOP No.: ME-HgCVAA  
 BLOCK 1 2 (circle one)

Logbook # 1198

NOTE: All temperatures are recorded as corrected temperatures.

LvL Work Order#	pH < 2 (Liq)	Spike Vol (mL)	Spike Conc. ( $\mu\text{g/L}$ )	Initial Wt. or Vol (g or mL)	Final Sample Vol (mL)	Comments, % Solids, etc.
Blank				10ml	50	
0.2ug/l		0.100		10ml	50	
1.0ug/l		0.500		10ml	50	
2.0ug/l		1.000		10ml	50	
5.0ug/l		2.500		10ml	50	
10.0ug/l		5.000		10ml	50	
ICV		0.175	2.5	10ml	50	
CEV		0.200	5.0	10ml	50	
ICB/CEB				10ml	50	
L302014-B4C1				0.31	50	
1302062-01				0.31	50	
L302014-DVP1				0.34 0.37	50	
1302063-01				0.38 0.39	50	
L302014-DVP2				0.36	50	
1302064-01		0.500	1.0	0.35	50	
1302065-01		0.500	1.0	0.32	50	
L302014-DVP3				0.36	50	
1302066-01		0.500	1.0	0.33	50	
1302067-01		0.500	1.0	0.32	50	
L302014-DVP4				0.37	50	
1302068-01		0.500	1.0	0.34	50	
1302069-01		0.500	1.0	0.38	50	
1302070-01		0.500	1.0	0.33	50	
L302014-DVP5				0.35	50	
1302071-01		0.500	1.0	0.35	50	
1302072-01		0.500	1.0	0.32	50	

Standard:	ID	Prep Date/Time	Reviewed By/Date:
ICAL/MS	RJ 120123S	24/13 1915	8mp. 02/07/13
ICV/CCV/LCS	(I.V. 1201911)	N/A	See book # <u>1198</u> for std traceability information

Soil LCS True Value = 1.29 mg/Kg  
 Standard # 1201014

Water Matrix Spiking Solution Concentration = 0.1  $\mu\text{g/ml}$   
 after LCS Spiking Concentration: 1.0  $\mu\text{g/ml}$

Lionville Laboratory

## MERCURY PREPARATION

Analyst: MelvinDate 2/4/13

Start Time/Temp:

End Time/Temp: See pageInstrument ID: HG3.1Balance # B14 /NAPipette Calibration (Daily) YLogbook # 1198Prep Batch: L302014Worksheet: HG020501

SOP No. ME-HgCVAA

BLOCK  1  2 (circle one)

NOTE: All temperatures are recorded as corrected temperatures.

Lvl Work Order#	pH <2 (Liq)	Spike Vol (mL)	Spike Conc. (µg/L)	Initial Wt. or Vol (g or mL)	Final Sample Vol (mL)	Comments, % Solids, etc.
<u>L302014-D026</u>				0.53	<u>SD</u>	
<u>MSG</u>		<u>0.500</u>	1.0	0.38	<u>SD</u>	
<u>1302067-02</u>				0.39	<u>SD</u>	
<u>W.E. Hg CVAA</u> <u>03</u>				0.36	<u>SD</u>	
<i>DW 2/4/13</i>						
Standard:	ID <u>034</u>	Prep Date/Time	Reviewed By/Date: <u>PMP, 02/07/13</u>			
ICAL/MS			See book # <u>1198</u> for std traceability information			
ICV/CCV/LCS						
Soil LCS True Value = <u>1.03 mg/kg</u>	mg/Kg	Water Matrix Spiking Solution Concentration = <u>0.1 µg/ml</u>				
Standard # <u>See page</u>		at Cr LCS Spiking Concentration: <u>1.0 µg/ml</u>				